

II. Status of the Claims

Claims 1-27 have been canceled. New claims 28-43 have been added.

The new claims find support throughout the specification and claims as originally filed. Support for the recitation of "enhancing sensitivity to abscisic acid" is present in, *e.g.*, page 10 lines 15-20; page 21 lines 31-32; the recitation of "a subsequence of at least 30 nucleotides of SEQ ID NO:1" is supported by, *e.g.*, page 4 lines 18-22; the recitation of "complementary to SEQ ID NO:1" is supported by, *e.g.*, page 4 lines 11-13. No new matter is added.

III. Claims Rejections

A. 35 USC §112 Second Paragraph

The Examiner rejected claims 1, 5-8, 11-16, 20, and 24-27 under 35 USC §112 second paragraph for alleged indefiniteness. In light of the cancellation of claims 1-27, Applicants address the rejections to the extent that they might be applicable to the new claims.

"ABH1 Polynucleotide Sequence"

The definition of the term "ABH1 polynucleotide sequence" is provided in the specification. See page 4 line 11 to page 5 line 2. For example, an "ABH1 polynucleotide sequence" is defined as a subsequence or full length of SEQ ID NO:1 or its complement; The length of an "ABH1 polynucleotide sequence" is also provided as typically comprising a coding sequence of at least about 30-40 nucleotides. The instant application also discloses that the loss or reduction of ABH1 protein function leads to increased sensitivity to ABA in a plant (*see, e.g.*, examples on page 21 lines 31-32 and page 23 lines 4-16). A person with ordinary skill in the art can understand the meaning of the term and its metes and bounds.

"Modulates," "At Least About," "And" Following "Plant," and Typographic Errors

New claims 28-43 do not recite the terms. Claim rejections based on the use of these terms are moot. Applicants thus respectfully request the withdrawal of the rejections under 35 USC §112 second paragraph.

B. 35 USC §101 and 35 USC §112 First Paragraph

Claims 1-27 were rejected under 35 USC §101 for alleged lack of utility. In light of the cancellation of claims 1-27, Applicants address the rejections to the extent that they may be applicable to the new claims 28-43.

New claims 28-43 are directed to a method for enhancing sensitivity to abscisic acid (ABA) in a plant by introducing into the plant a nucleic acid comprising an ABH1 polynucleotide sequence, which comprises at least 30 nucleotides of SEQ ID NO:1 or at least 30 nucleotides complementary to SEQ ID NO:1, thereby reducing the level of an ABH1 protein in the plant. The claims are also drawn to a transgenic plant cell with enhanced ABA sensitivity, which comprises the nucleic acid and having a reduced level of an ABH1 protein.

The specification provides description of the utility of the claimed method and transgenic plant cell. It is known that ABA mediates stomatal closure in a plant in response to drought (page 1 line 24). The present application provides experimental evidence that loss of ABH1 function leads to heightened sensitivity to ABA in a plant (*see e.g.*, page 21 lines 31-32). Most significantly, under drought conditions, plants with diminished ABH1 activity remained green and turgid while plants with normal level of ABH1 protein showed leaf chlorosis and wilting (page 23 lines 4-16). The reduction of ABH1 protein activity in a plant, as demonstrated by the present invention, can thus enhance the plant's drought tolerance. This is a well established and credible utility.

The Examiner further rejected the claims under 35 USC §112 first paragraph, stating that since the claimed invention lacks utility, one of skill in the art would not know how to use the invention. As explained above, the present invention has

well established utility and thus, one skilled in the art will know how to use the invention. The enablement of the claimed invention is addressed more fully below.

Applicants respectfully request the withdrawal of the rejections under 35 USC §101 and §112 second paragraph for alleged lack of utility.

C. 35 USC §112 First Paragraph

Written Description

Claims 1-5, 7, 9-12, 14, 16-24, and 26 were rejected under 35 USC §112 first paragraph for alleged failure to satisfy the written description requirement. In light of the cancellation of claims 1-27, Applicants address the rejections to the extent that they may be applicable to the new claims.

Claims 1-27 are directed to ABH1 polynucleotide sequences with at least 70% identity to SEQ ID NO:1 and ABH1 polypeptide sequences with at least 70% identity to SEQ ID NO:2. The Examiner asserted that, without disclosing the functional structure of the ABH1 polypeptide, the specification does not properly describe the invention in the scope as claimed.

To satisfy the requirement of written description, an application must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. MPEP §2163 Sec. I. New claims 28-43 recite a nucleic acid molecule comprising an ABH1 polynucleotide sequence, which is further described as consisting of a polynucleotide sequence complementary to SEQ ID NO:1 or a polynucleotide sequence complementary to an at least 30-nucleotide fragment of SEQ ID NO:1, and inhibiting the expression of an ABH1 protein. The claims fully comply with the requirements for written description of a chemical genus as set forth in *University of California v. Eli Lilly & Co.*, 43 USPQ2d 1398 (Fed. Cir. 1993). The Federal Circuit stated in *Lilly*, "[a] description of a genus of cDNAs may be achieved by means of ... a recitation of structural features common to the members of the genus...." 43 USPQ2d at 1406. The Federal Circuit further stated that

an adequate written description "requires a precise definition , such as by structure, formula, chemical name, or physical properties." *Fiers v. Revel*, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993). New claims 28-43 set forth the structural feature of the claimed genus of nucleic acids: they all comprise an ABH1 polynucleotide sequence, which is complement to either full length SEQ ID NO:1 or a fragment of SEQ ID NO:1 with a length of at least 30 nucleotides. Therefore, the nucleic acid molecules of the claims are defined via shared structural features, and the written description requirement under *Lilly* is satisfied.

Moreover, new claims 28-43 also set forth the functional feature of the genus of nucleic acids: the ability to inhibit the expression of an ABH1 protein. With both structural and functional features of the claimed nucleic acids precisely defined, Applicants respectfully request that the written description rejections be properly withdrawn.

Enablement

Claims 1-27 were rejected under 35 USC §112 first paragraph for alleged failure to meet the enablement requirement. In light of the cancellation of claims 1-27, Applicants address the rejections to the extent that they may be applicable to the new claims.

The recitation of percentage identity to SEQ ID NO:1 or 2 in claims 1-27 was again used as the basis for the enablement rejections. The Examiner stated that one skilled in the art would not know how to practice the invention as claimed when the functional structure of ABH1 protein is not disclosed.

To satisfy the enablement requirement, an application must contain sufficient information regarding the subject matter of the claims so as to enable one skilled in the art to make and use the claimed invention. MPEP §2164.01. The test for enablement is set forth in *In re Wands*, 858 F.2d 731, 8 USPQ 2d 1400 (Fed. Cir. 1988), and requires consideration of multiple factors including: the breadth of the claims; the

nature of the invention; the state of the prior art; the level of predictability in the art; the amount of direction provided by the inventor; the existence of working examples; and the quantity of experimentation needed to make or use the invention based on the content of the disclosure.

In the present case, the claims are directed to nucleic acid molecules comprising an ABH1 polynucleotide sequence with a structure definitively referred to SEQ ID NO:1 and a readily testable functional feature. The claim scope is neither overbroad nor vague. The specification has set forth detailed description of experimental procedures for testing the reduction of ABH1 protein expression (*e.g.*, page 13 line 15 to page 15 line 27). These procedures rely on techniques well known to those skilled in the pertinent art. The specification also contains ample guidance to practice the invention, such as methods of isolating claimed nucleic acid sequences (*see, e.g.*, page 16 line 12 to page 17 line 18), preparation of recombinant vectors (*see, e.g.*, page 17 line 20 to page 19 line 3), productions of transgenic plants (*see, e.g.*, page 19 line 5 to page 20 line 24), and assays for testing heightened ABA sensitivity (*see, e.g.*, Examples on page 21 line 27 to page 23 line 16). The level of technical sophistication is high in the art of molecular biology, and the results are predictable. Although some experimentation may be necessary to identify the ABH1 polynucleotide sequences useful for practicing the invention, such experimentation utilizes well-established techniques and is routinely conducted in the art and thus does not constitute undue experimentation. MPEP §2164.01.

In summary, Applicants believe that the disclosure by the present application is sufficiently enabling for a person with ordinary skill in the art to practice the invention and that no undue experimentation is required. The rejections for inadequate enablement should thus be properly withdrawn.

D. 35 USC §102

Claims 11 and 14-18 were rejected 35 USC §102(b) for allegedly being anticipated by NCBI Accession Number 4558656 (Lin et al.). In light of the cancellation

of claims 1-27, Applicants address the rejections to the extent that they may be applicable to the new claims.

Lin et al. disclose a DNA sequence from *Arabidopsis* that encodes for a polypeptide comprising the amino acid sequence of SEQ ID NO:2. Claims 28-43 relate to the use of ABH1 polynucleotide sequences to enhance ABA sensitivity in a plant and to generate a transgenic plant that contains the ABH1 polynucleotide sequence. The Examiner has identified nothing in the Lin et al. reference that discusses or suggests the claimed method or transgenic plant. Lin et al. do not include all elements of the claims of the present application, and the claims are thus not anticipated.

Furthermore, since Lin et al. do not teach the function of the protein the amino acid sequence of which is set forth in SEQ ID NO:2, one skilled in the art would not be motivated to use a nucleic acid comprising an ABH1 polynucleotide sequence to enhance ABA sensitivity in a plant or to generate a transgenic plant cell containing a nucleic acid comprising an ABH1 polynucleotide sequence, the claims of the present invention are therefore not obvious in light of Lin et al.

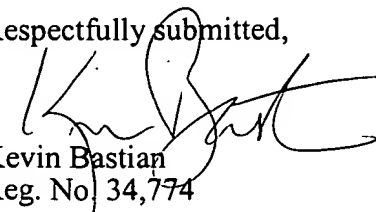
Applicants respectfully request the withdrawal of the rejections under 35 USC §102.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,


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APPENDIX

CLAIMS PENDING UPON ENTRY OF AMENDMENT

28. (New) A method for enhancing sensitivity to abscisic acid in a plant, the method comprising: introducing into the plant a nucleic acid molecule that comprises an ABH1 polynucleotide sequence and thereby reducing the level of an ABH1 protein in the plant, wherein the ABH1 polynucleotide sequence is complementary to SEQ ID NO:1 or to a subsequence of at least 30 nucleotides of SEQ ID NO:1, and inhibits the expression of the ABH1 protein.

29. (New) The method of claim 28, wherein the ABH1 polynucleotide sequence is complementary to SEQ ID NO:1.

30. (New) The method of claim 28, wherein the nucleic acid comprises a promoter operably linked to the ABH1 polynucleotide sequence.

31. (New) The method of claim 30, wherein the at least one promoter is a tissue-specific promoter.

32. (New) The method of claim 31, wherein the tissue-specific promoter preferentially directs transcription in guard cells.

33. (New) The method of claim 32, wherein the tissue-specific promoter is a KAT1 promoter.

34. (New) The method of claim 28, wherein the nucleic acid is introduced into the plant through sexual cross.

35. (New) The method of claim 28, wherein the nucleic acid is introduced into the plant using *Agrobacterium*.

36. (New) A transgenic plant with enhanced sensitivity to abscisic acid, the transgenic plant comprising a nucleic acid molecule that comprises an ABH1 polynucleotide sequence and having a reduced the level of an ABH1 protein, wherein the ABH1 polynucleotide sequence is complementary to SEQ ID NO:1 or to a subsequence of at least 30 nucleotides of SEQ ID NO:1, and inhibits the expression of the ABH1 protein.

37. (New) The transgenic plant of claim 36, wherein the ABH1 polynucleotide sequence is complementary to SEQ ID NO:1.

38. (New) The transgenic plant of claim 36, wherein the nucleic acid comprises a promoter operably linked to the ABH1 polynucleotide sequence.

39. (New) The transgenic plant of claim 38, wherein the promoter is a tissue-specific promoter.

40. (New) The transgenic plant of claim 39, wherein the tissue-specific promoter preferentially directs transcription in guard cells.

41. (New) The nucleic acid of claim 40, wherein the tissue-specific promoter is a KAT1 promoter.

42. (New) The transgenic plant of claim 36, wherein the nucleic acid is introduced into the plant cell through sexual cross.

43. (New) The transgenic plant of claim 36, wherein the nucleic acid is introduced into the plant cell using *Agrobacterium*.